

FLOYD AND WALLY'S OPERATIONAL TEST AND EVALUATION TOP 10 LESSONS LEARNED

Introduction

Using the knowledge acquired from our direct and indirect experiences in operational tests and evaluations (OT&Es) during the last 2 years, we would like to share some hard-won lessons learned. Although every acquisition program is unique, one common thread running through all of them is the operational evaluation and associated developmental and/or operational testing. Both combat developers and program managers (PMs) can benefit from some of these lessons.

Requirements

As the old saying goes, "first things first." We see several common problems with requirement documents. First and foremost, be careful what you wish for because the T&E community will test and evaluate to your standard. This implication is particularly critical in the area of survivability, described later in this article. Second, why would the user wish to require something that the PM, for whatever reason, cannot deliver? For example, why require a nondevelopmental item system to survive an electromagnetic pulse if the PM cannot afford to harden the system?

Finally, document your requirements clearly, concisely, and in measurable terms. We know this may be difficult in today's environment of performance specifications. However, the Army Test and Evaluation Command (ATEC) member of the PM's Test Integrated Product Team can provide valuable assistance with this.

Documentation

Despite the impact of recent acquisition streamlining, T&E remains a document-intensive field. The main documents needed from the Army Training and Doctrine Command are the Operational Requirements Document (ORD), Critical Operational Issues and Criteria (COIC), Operational Mode Summary/Mission Profile (OMS/MP), and the Failure Definition and Scoring Criteria

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(FDSC). The ORD, COIC, and FDSC are essentially the rulebooks for all testing. These documents are the basis for the System Evaluation Plan (SEP) and the various test plans developed to meet the SEP's requirements. The OMS/MP guides the Army Operational Test Command's (OTC's) test planning for shaping the operational environment. The PM's T&E Master Plan documents the general concepts for all aspects of testing. Combat and materiel developers are encouraged to frequently consult with their ATEC System Team (AST) representatives when preparing or modifying these documents.

Schedule Planning

All programs inevitably have unforeseen problems that cause schedule and performance trade-offs. Philip E. Coyle III, former Director of OT&E in the Office of the Secretary of Defense, recently addressed this concern in his article in the November-December 2000 issue of *Program Manager*. Coyle said, "... Nevertheless, acquisition programs are taking more risk, and it is showing up in operational testing. ... The greatest current concern of the Service Operational Test Agencies is the so-called *rush to failure*. ..." How should a PM best plan to mitigate this risk? Lay your schedule out realistically and include ATEC in the process of costing out and scheduling the various test events. We also recommend an early-on operational test or assessment prior to the Initial OT&E (IOT&E).

DT Versus OT

Many PMs believe that their developmental testing (DT) plan can provide all or most of the information required for the independent operational evaluation. We absolutely disagree. DT and operational testing (OT) are not differ-

ent ways of obtaining the same results; rather, they complement one another. In our experience, regardless of the scope of the developmental test, every operational test uncovers something not found in DT. We recommend rigorous, thorough DT with all (or as much as possible) nondestructive testing completed prior to beginning OT. The scope of OT focuses on the user's COIC.

Logistics

The two activities that normally suffer the most from program delays are logistics and OT. Because OT relies so heavily on the logistics activities of developing training, manuals, and system support, the best way to mitigate risk in OT is to have a strong logistics program. We highly recommend completion of the log demo prior to the IOT&E and having final draft-quality manuals delivered to the OTC at least 4 months prior to the start of testing for use in test planning.

OT Execution

Although most PMs are highly anxious about OT, they underestimate the pre-OT effort required to conduct a successful operational test. All test articles and support items should arrive at the OT site a minimum of 1 week prior to test training. PMs should use this week to ensure the test articles are in prime condition. All manuals, spare parts, and training aids should be present and serviceable. Remember that the soldiers you train will take their first impressions with them, regardless of how well your system performs. Your representative during this week should be a technician or engineer with a toolbox and a credit card who is not afraid to get his or her hands dirty!

Once the test begins, we recommend that PMs and combat developers maintain a representative at the test site to troubleshoot any problems the OTC test officer may encounter. We can provide office space with phone and Internet access in our test headquarters. This

allows us to have ready access to your troubleshooter, and allows you to remain in close contact during the test.

If you have a solid new equipment training plan, your system has completed a rigorous developmental test, and your manuals and system support are in place, then leave the test execution to OTC and relax. You are best served by remaining a step removed and not taking the first reports at face value. Once the test ends, you will have your chance to discuss and dispute the test findings with the evaluator and test officer during the data authentication group and reliability, availability, and maintainability scoring conference.

System Operational Employment

To effectively evaluate a system's performance, the evaluator must understand the system's operational mode of employment. Both combat developers and PMs, in their haste to meet cost schedule and performance requirements, provide numerous program-review briefings and system-information papers to AST members. Each AST member is responsible for understanding the operational employment of the system. Failure to do so may result in a poorly written SEP or, even worse, development of an ineffective SEP—the guidebook for the system evaluation. Combat developers and PMs should work with the AST to ensure understanding of how the system will be employed on the battlefield. As an IPT, we are able to design a better plan that will evaluate the right performance requirements and reflect a clear picture of the system's capability.

SEP

As stated previously, the SEP defines our plan for T&E of a given system. It has been our experience in writing and implementing SEPs that, during the course of the program, significant requirement or system-employment changes occur. Depending on when these changes occur, they are often not reflected in the SEP. We recommend that combat developers not change ORD requirements after the SEP is approved, or within 90 days of starting IOT&E.

With few exceptions, changes to the SEP must be discussed, coordinated, and approved before going into the IOT&E. Failure to update the SEP when significant changes occur often results

in T&E requirements that are no longer valid, poorly planned additional test requirements hastily added to the SEP, and costly and time-consuming retest. We highly recommend that the materiel developer, combat developer, and the AST continuously monitor significant changes affecting the system through frequent and open communication during IPT meetings.

System Evaluation Report (SER)

The SER is an acquisition tool used by the PM and the user as a guide to improve system performance in areas such as effectiveness, suitability, and survivability, which were either marginal or not met during the IOT&E. Unfortunately, many PMs view the SER as a pass/fail or go/no-go report for their respective systems. This is not the case from the standpoint of the AST. The AST, in coordination with the PM and user, reviews all data collected from T&E events and simulations as well as the results from the IOT&E. The group meets, reviews, and authenticates the data.

The AST develops the SER using agreed-upon data. There are no secrets regarding how well or how poorly the system performed. As Detective Joe Friday of the TV program *Dragnet* frequently said, "The facts and only the facts ma'am," is what we present in the SER.

Another issue related to the SER is the Emerging Results Brief (ERB). Many PMs request an ERB based on their schedule, which has usually slipped to the right. ATEC will make every effort to accommodate the PM. However, release of emerging evaluation results is the ATEC commanding general's call and is done on a case-by-case basis. Our experience has shown that routinely providing an ERB is counterproductive to good and timely analysis and completion of the SER. PMs, please keep this in mind when requesting an ERB.

Materiel Release

Many systems are not ready for full materiel release to the Army. A conditional materiel release (CMR) is becoming the norm rather than the exception. Full release of a system requires that it be Type Classified-Standard, safe to operate, operationally effective, and logistically supportable. More and more

often, our SERs are reflecting that many systems are not meeting the COIC.

An area of particular concern that results in many CMRs is survivability requirements. The specific areas of survivability that continue to require weapon systems be granted a CMR are high altitude electromagnetic pulse, electromagnetic environmental effects, and chemical contamination/decontamination survivability. DOD 5000.2-R states "Unless waived by the MDA [milestone decision authority], mission critical systems regardless of their ACAT [acquisition category], shall be survivable to the threat levels anticipated in the operating environment." Ineffective T&E of these areas and MDA waivers continue to occur more and more frequently.

We recommend that PMs review the number of CMRs granted, the subsequent cost to their programs to implement get-well plans, and take appropriate action to ensure that the number of CMRs do not increase.

Conclusion

The PM, and the acquisition community as a whole, do a great job of ensuring that we field operationally effective, suitable, and survivable equipment to the warfighter. Remember, we are not in the pass/fail business. Our job is to give decisionmakers, developers, and users a clear picture of what a system can and cannot do.

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